Trend Study 11B-9-05

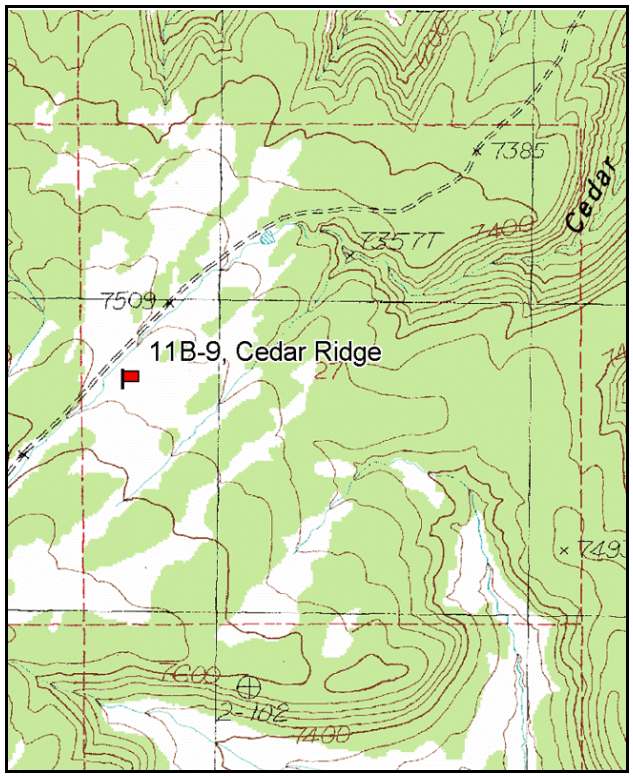
Study site name: Cedar Ridge . Vegetation type: Black Sagebrush .

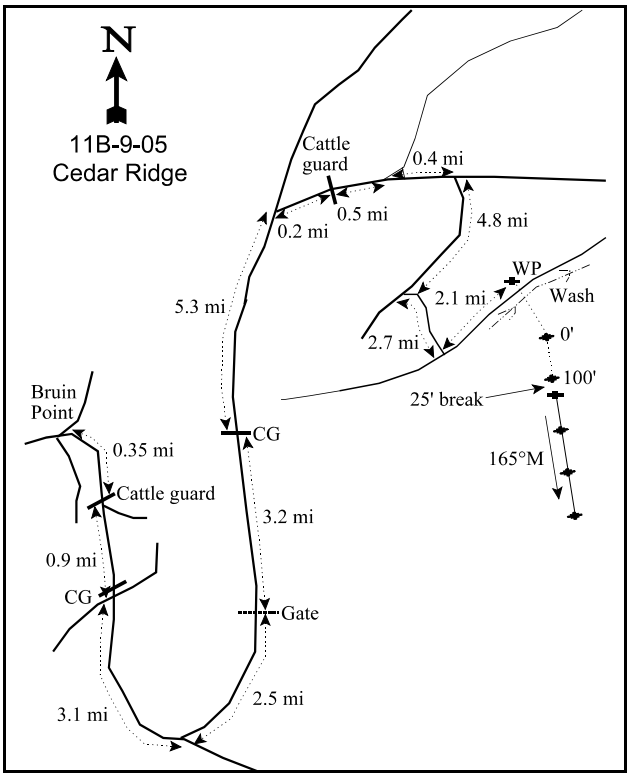
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Go through an intersection beyond another cattle guard and go 3.1 miles. Turn left at the fork and continue 2.5 miles to a gate by a cabin. Proceed 3.2 miles, cross a cattle guard and go 5.3 miles on the main road to a fork. Bear right and continue 0.2 miles to a cattle guard. Go 0.5 miles to a major fork. Stay right and keep going 0.4 miles (passing Cottonwood 11B-7) to another fork. Stay on the main road (right) and go 4.8 miles to a junction. Turn left and go 2.7 miles to a "T" intersection. Turn left and go 2.1 miles to a witness post on the left side of the road. The transect starts 280 feet southeast of the witness post across the wash in the sage flat. There is a 25 foot break in the baseline between the end of line 1 and 2. The end of line 1 is marked by partially buried rebar. The rest of the stakes, including the witness post, are green fence posts.





Map Name: Cedar Ridge Canyon Diagrammatic Sketch

Township 13S , Range 16E , Section 28 GPS: NAD 27, UTM 12S 4390704 N, 575696 E

DISCUSSION

Cedar Ridge - Trend Study No. 11B-9

This study is located on the wide southwest portion of Cedar Ridge about 6 miles east of the Green River. Cedar Ridge is an important concentration area for wintering mule deer, although much of the use occurs on the lower limits of the ridge. The study site is located within an extensive sagebrush park at an elevation of 7,600 feet. This area and surrounding country is basically level, but dissected by numerous deep, intermittent drainages, which drain to the northeast. Slope is only about 3%. The area is used by deer, elk, and a large number of wild horses. Deer pellet groups on the site indicate light use during all readings although several antler drops were found in 1986. A well worn trail passes through the flat. Both cattle and horse droppings were common in 1994, but significant use was not evident. There was also light elk sign observed in 1994. During the 2000 reading, pellet group data estimated 29 elk and 21 horse days use/acre (71 edu/ha and 52 hdu/ha). No deer pellet groups were encountered, but a few were picked up in the quadrats. In 2005, 38 elk, 17 deer, 1 cow, and 30 horse days use/acre (94 edu/ha, 43 ddu/ha, 2cdu/ha, 75 hdu/ha) were estimated. Also in 2005, 9 sage grouse pellet groups/acre were observed.

The soil is moderately shallow as indicated by the abundance of black sagebrush. A rocky layer is found around 12 to 15 inches in depth which limits deeper soil measurements. Effective rooting depth is estimated at almost 13 inches. The soil has a loam texture with a neutral soil reaction (7.0 pH). Phosphorus is limited at only 5.3 ppm, where values less than 6 ppm may limit normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). The soil is fairly rocky, but there is little concentration of erosion, pavement, or rocks on the soil surface. It is loosely compacted with a fair amount of bare soil. Litter and vegetation cover are evenly dispersed and provide adequate soil protection. Some small rills are evident, with an old gully north of the transect along the road. Erosion should not be a problem as long as a high percentage of ground cover comes from herbaceous species. The erosion condition class determined soil movement as slight in 2005 due to moderate pedestalling around the shrubs and perennial grasses.

This open sagebrush park is surrounded by pinyon-juniper woodland. The dominant browse species is black sagebrush, which had cover estimated at 12% in 1994, 21% in 2000, and 24% in 2005. Density was estimated at 5,733 plants/acre in 1986, and appeared to be expanding with an extremely high number of seedlings. By 1994, the population increased 4-fold to 22,840 plants/acre. Many of the seedlings sampled in 1986 survived to become young plants as half of the population consisted of young plants. Also, the 1994 reading was done with the larger sample size which better estimated shrub populations. Leader growth was good and the plants appeared vigorous. Use was mostly light. The population of black sagebrush increased slightly in 2000 to 25,180 plants/acre. The stand was mainly mature (84%), while seedlings and young were still common and mature plants appear to be producing abundant seed. The population decreased 54% in 2005 to 11,660 plants/acre. The population was 75% mature and had increased from 8% decadence (2000) to 15%. Use continued to be light, vigor good, and decadence low.

Other shrubs present include: dwarf rabbitbrush, rubber rabbitbrush, broom snakeweed, and gray horsebrush. These species make up only a small percent of the browse composition. Junipers appear to be slowly invading the flat, but will not threaten the site for decades. Point-center quarter data from 2000 estimated only 12 pinyon and 11 juniper trees/acre with average diameters of 4.5 inches and 3.4 inches, respectively. Point quarter measurements were not taken in 2005. The surrounding pinyon-juniper stand provides good cover and still maintains a good shrub understory.

Grasses and forbs are moderately abundant and an important component of this site. They not only provide valuable forage, but they also provide excellent protective ground cover. The most abundant species of grass is needle-and-thread. Bluebunch wheatgrass, mutton bluegrass, Sandberg's bluegrass, and thickspike wheatgrass are also fairly abundant. Use of mutton and Sandberg bluegrass appeared fairly heavy in 2000.

Forb composition is relatively diverse for this type of site with 24 species of forbs encountered in 1994, 18 in 2000, and 26 in 2005. Common species include the low growing pussytoes, sulfur eriogonum, mat penstemon, and long-leaf phlox. Lobe-leaf groundsel and scarlet globemallow are also common.

1986 APPARENT TREND ASSESSMENT

The area appears in good health, with a good diversity of species and moderate amounts of forage production for this range type. The sagebrush population is increasing with a very high biotic potential (# of seedlings). Sagebrush provides the bulk of the forage on the site, but the grasses are also vigorous and productive. Invasion by the few increaser woody species and pinyon-juniper is not currently a threat. Therefore, vegetation trend appears stable to improving on this site. The site provides good normal winter range for deer and elk. The soil has excellent protection and although there is the potential for erosion the current trend appears stable.

1994 TREND ASSESSMENT

The area still remains in good health. The trend for soils is slightly up with a decrease in percent bare ground (46% to 33%), even with a decrease in nested frequency value for grasses, this was compensated for with an increase in nested frequency for the forbs. The primary browse species is black sagebrush, which makes up 90% of the total browse cover. The density is quite high at 22,840 plants/acre, but 50% of the population is classified as young plants. Percent decadency has declined to only 5% and the browse trend is considered up. The trend for the herbaceous understory is mixed because the nested frequency value of grasses has decreased, while the nested frequency for forbs has increased. Trend for the herbaceous understory is therefore considered stable, but could decline with continued drought. The Desirable Components Index score is excellent due to moderate browse cover, low browse decadence, and excellent perennial forb cover.

TREND ASSESSMENT
soil - slightly up (+1)
browse - up (+2)
herbaceous understory - stable (0)
winter range condition (DC Index) - Excellent (74) Lower Potential scale

2000 TREND ASSESSMENT

Trend for soil is slightly improved with decreases in bare soil, increases in litter cover, and improved ratios of protective ground cover (vegetation, litter and cryptogams) to bare ground. There is little erosion occurring due to the level terrain combined with good herbaceous cover. Trend for browse is stable. The key species, black sagebrush, has increased in density and cover. Seedlings and young are still abundant, vigor is good and use light. However, continued increases in density and cover will negatively effect the herbaceous understory. Trend for the herbaceous understory is stable. Sum of nested frequency for grasses and forbs has remained similar to 1994. Nested frequency of the dominant grass, needle-and-thread, declined significantly since 1994, but cover remained similar and several other species of grass increased in nested frequency. The DCI score remained excellent with increases in browse cover and perennial grass cover.

TREND ASSESSMENT
soil - slightly up (+1)
browse - stable (0)
herbaceous understory - stable (0)
winter range condition (DC Index) - Excellent (77) Lower Potential scale

2005 TREND ASSESSMENT

Trend for soil is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground remained nearly identical from 2000 to 2005. The trend for browse is stable, despite the apparent self thinning of black sagebrush. Density decreased by half from 2000 to 2005, adjusting to lower precipitation and severe intraspecific competition between adult plants. Decadence was still low at only 15%. The population continues to be healthy and very abundant with only 3% of the population classified as dying and/or of poor vigor. Cover increased to nearly 24%. The herbaceous understory trend is slightly up. Perennial grass and forb species increased in the interval of 2000 and 2005. The sum of the nested frequency for perennial grasses and perennial forbs increased 17%. The DCI score remained excellent.

TREND ASSESSMENT
soil - stable (0)
browse - stable (0)
herbaceous understory - slightly up (+1)
winter range condition (DC Index) - Excellent (75) Lower Potential scale

HERBACEOUS TRENDS --
Management unit 11B, Study no: 9

Type	Species	Nested Frequency				Average Cover %		
		'86	'94	'00	'05	'94	'00	'05
G	Agropyron dasystachyum	a10	a8	b66	a15	.02	.81	.09
G	Agropyron spicatum	66	49	61	40	.86	.51	1.25
G	Bouteloua gracilis	30	43	30	29	2.12	.91	.21
G	Bromus tectorum (a)	-	a-	a2	b16	-	.00	.09
G	Koeleria cristata	a-	b25	a-	c101	.29	-	.85
G	Oryzopsis hymenoides	-	3	7	-	.00	.09	-
G	Poa fendleriana	c190	ab57	b87	a37	.43	2.38	.47
G	Poa secunda	b70	a8	b92	c172	.01	.62	1.83
G	Sitanion hystrix	b40	ab21	a4	b33	.06	.03	.53
G	Stipa comata	b246	b269	a160	a194	5.36	4.62	4.27
Total for Annual Grasses		0	0	2	16	0	0.00	0.08
Total for Perennial Grasses		652	483	507	621	9.21	9.99	9.53
Total for Grasses		652	483	509	637	9.21	10.00	9.62
F	Agoseris glauca	-	-	3	1	-	.00	.03
F	Antennaria parvifolia	ab65	b87	b98	a37	2.59	2.63	.32
F	Arenaria fendleri	-	-	1	-	-	.00	-
F	Arabis perennans	b10	ab3	a-	b16	.01	-	.07
F	Astragalus convallarius	c12	ab3	bc10	a-	.00	.12	-
F	Astragalus tenellus	a-	ab12	b18	a-	.03	.37	.00
F	Astragalus utahensis	-	3	2	6	.00	.00	.01
F	Castilleja flava	-	-	9	4	-	.07	.03

Type	Species	Nested Frequency				Average Cover %		
		'86	'94	'00	'05	'94	'00	'05
F	Castilleja linariaefolia	$_{b}$23	$_{a}$4	$_{ab}$12	$_{a}$1	.03	.10	.00
F	Calochortus nuttallii	$_{a}$3	$_{b}$42	$_{a}$7	$_{b}$25	.11	.01	.08
F	Cryptantha sp.	$_{ab}$23	$_{ab}$18	$_{b}$30	$_{a}$12	.15	.28	.13
F	Delphinium nuttallianum	$_{b}$12	$_{a}$-	$_{ab}$2	$_{ab}$5	-	.01	.04
F	Eriogonum alatum	-	2	2	3	.03	.03	.00
F	Erigeron eatonii	-	2	1	-	.03	.00	.00
F	Eriogonum umbellatum	29	29	33	39	.28	.45	1.02
F	Hedysarum boreale	$_{a}$-	$_{c}$33	$_{ab}$11	$_{bc}$25	.95	.07	1.50
F	Heterotheca villosa	-	-	3	-	-	.00	-
F	Ipomopsis aggregata	-	-	3	-	-	.00	-
F	Lappula occidentalis (a)	-	$_{a}$-	$_{a}$-	$_{b}$14	-	-	.03
F	Lesquerella sp.	-	4	-	-	.03	-	-
F	Linum lewisii	-	-	2	5	-	.03	.02
F	Machaeranthera canescens	-	3	5	7	.00	.01	.36
F	Machaeranthera grindelioides	5	5	-	6	.01	-	.04
F	Penstemon caespitosus	$_{a}$35	$_{b}$70	$_{a}$47	$_{a}$23	1.65	.92	.09
F	Penstemon strictus	6	12	11	13	.05	.03	.11
F	Phlox hoodii	2	4	5	-	.03	.16	-
F	Phlox longifolia	$_{a}$60	$_{a}$65	$_{a}$57	$_{b}$103	.21	.29	.64
F	Polygonum douglasii (a)	-	$_{a}$-	$_{a}$-	$_{b}$135	-	-	.39
F	Sedum lanceolatum	-	-	-	5	-	-	.01
F	Senecio multilobatus	$_{a}$46	$_{a}$45	$_{a}$50	$_{b}$149	.27	.30	2.41
F	Sphaeralcea coccinea	$_{a}$19	$_{b}$62	$_{a}$27	$_{a}$19	.50	.11	.09
F	Townsendia incana	$_{a}$-	$_{a}$-	$_{b}$16	$_{a}$-	-	.05	-
F	Trifolium sp.	$_{b}$11	$_{a}$-	$_{ab}$6	$_{b}$18	-	.02	.11
F	Unknown forb-perennial	20	-	-	-	-	-	-
F	Vicia sp.	-	1	-	-	.00	-	-
Total for Annual Forbs		0	0	0	149	0	0	0.42
Total for Perennial Forbs		381	509	471	522	7.03	6.14	7.17
Total for Forbs		381	509	471	671	7.03	6.14	7.60

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 11B, Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'94	'00	'05	'94	'00	'05
B	Amelanchier utahensis	0	0	1	-	-	.03
B	Artemisia nova	100	100	100	11.60	20.80	23.76
B	Artemisia tridentata vaseyana	0	0	0	-	-	.15
B	Chrysothamnus depressus	34	41	38	1.23	.81	1.75
B	Chrysothamnus viscidiflorus	2	0	2	-	-	-
B	Gutierrezia sarothrae	16	10	16	.06	.01	.25
B	Juniperus osteosperma	0	1	4	-	.18	1.00
B	Opuntia sp.	2	0	0	.03	-	-
B	Pediocactus simpsonii	0	0	2	-	-	-
B	Pinus edulis	0	2	1	-	.03	.15
B	Tetradymia canescens	5	5	8	-	.03	-
Total for Browse		159	159	172	12.93	21.87	27.11

CANOPY COVER, LINE INTERCEPT --
Management unit 11B, Study no: 9

Species	Percent Cover	
	'00	'05
Artemisia nova	-	25.63
Chrysothamnus depressus	-	1.63
Chrysothamnus viscidiflorus	-	.28
Gutierrezia sarothrae	-	.10
Juniperus osteosperma	.60	.96
Pinus edulis	.20	.28
Tetradymia canescens	-	.15

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 11B, Study no: 9

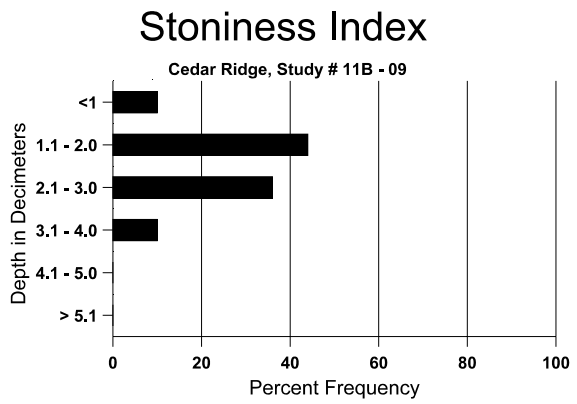
Species	Average leader growth (in)
	'05
Artemisia nova	1.3

BASIC COVER --
Management unit 11B, Study no: 9

Cover Type	Average Cover %			
	'86	'94	'00	'05
Vegetation	7.75	29.64	36.77	37.77
Rock	0	.58	.28	.59
Pavement	.75	.28	1.68	.48
Litter	44.50	25.51	43.31	36.57
Cryptogams	.75	.56	2.74	1.91
Bare Ground	46.25	33.27	31.65	35.69

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 9, Study Name: Cedar Ridge

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
12.9	64.6 (11.3)	7.0	47.3	32.2	20.6	2.4	5.3	243.2	0.7



PELLET GROUP DATA --
Management unit 11B, Study no: 9

Type	Quadrat Frequency		
	'94	'00	'05
Rabbit	12	8	17
Grouse	-	-	-
Horse	12	3	11
Elk	5	20	19
Deer	9	4	10
Cattle	1	-	-

Days use per acre (ha)	
'00	'05
-	-
9/acre	9/acre
16 (40)	30 (75)
29 (71)	38 (94)
-	17 (43)
-	1 (2)

BROWSE CHARACTERISTICS --
Management unit 11B, Study no: 9

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**20**	-	20	-	-	-	0	0	-	-	0	-/-
Artemisia nova												
86	**5733**	15800	2333	2000	1400	-	42	7	24	-	0	17/17
94	**22840**	1920	11380	10380	1080	380	6	.43	5	2	2	14/21
00	**25200**	4780	2020	21160	2020	620	8	.55	8	4	4	9/15
05	**11660**	5660	1200	8700	1760	1120	3	0	15	3	3	13/19
Chrysothamnus depressus												
86	**1332**	-	400	866	66	-	0	0	5	-	0	4/7
94	**3840**	-	120	3580	140	40	0	0	4	2	2	4/7
00	**4400**	40	200	4100	100	40	0	0	2	2	2	3/8
05	**2900**	360	340	2100	460	100	33	33	16	4	5	5/9
Chrysothamnus nauseosus												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	19/24
00	**0**	-	-	-	-	-	0	0	-	-	0	20/21
05	**0**	-	-	-	-	-	0	0	-	-	0	23/26
Chrysothamnus viscidiflorus												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**40**	-	20	20	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**40**	-	-	40	-	-	0	0	-	-	0	13/14
Gutierrezia sarothrae												
86	**1532**	66	333	1133	66	-	0	0	4	-	0	6/4
94	**540**	-	60	480	-	-	0	0	0	-	0	6/7
00	**300**	-	40	260	-	-	0	0	0	-	0	4/4
05	**400**	-	40	360	-	-	0	0	0	-	0	9/9

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Juniperus osteosperma												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**20**	-	-	20	-	-	0	0	-	-	0	-/-
05	**80**	-	80	-	-	-	0	0	-	-	0	-/-
Opuntia sp.												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**80**	-	-	80	-	-	0	0	-	-	0	4/4
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Pediocactus simpsonii												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**40**	-	-	40	-	-	0	50	-	-	0	1/2
Pinus edulis												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**40**	-	20	20	-	-	0	0	-	-	0	-/-
05	**20**	-	20	-	-	-	0	0	-	-	0	-/-
Tetradymia canescens												
86	**133**	-	-	133	-	-	100	0	0	-	0	11/11
94	**140**	-	-	120	20	-	0	0	14	-	0	6/9
00	**120**	-	20	60	40	-	33	0	33	-	0	5/7
05	**200**	-	40	160	-	-	0	0	0	-	0	9/13